

JPEG 2000

**NIMA Library 4.0 &
Image Product Library 4.0
Implementation**

NL 4.0/IPL 4.0 JPEG 2000

- NL 4.0/IPL 4.0 Ingests NITF 2.1 Files containing JPEG 2000 (J2k) Compressed Images or Spatial Chips
 - Each Image is Compressed with
 - Either the Visually Lossless (VL) or the Numerically Lossless (NL) Algorithm
 - Up to 25 Image Quality (or Bit Rate) Layers
 - Up to 5 RSETs (R1-R5) encoded in the J2k codestream
 - 1024x1024 Tiles; no padding of partial tiles
- NL 4.0/IPL 4.0 Creates J2k Compressed Browse Images
 - Overview and Thumbnail compressed with VL Algorithm
 - Overview code stream contains R1-R5 and 2 Quality Layers (0,1)
 - Thumbnail is produced by parsing R2 from the Overview Image code stream
 - Overview code stream is Bit Rate Limited to 0.5 bits/pixel
 - IPL 4.0 will have a site selectable option to produce Compressed Browse Images in JFIF instead of J2k

NL 4.0/IPL 4.0 JPEG 2000

- NL 4.0/IPL 4.0 Exports J2k Compressed Full Images or Spatial Chips
 - Spatial Chips
 - Chips are produced by Parsing the J2k tiles from the original J2k code stream without decompressing the original image
 - At Full Image Quality (All Quality Layers) or Bit Rate Reduced (fewer quality layers)
 - Bit Rate Reductions are produced by Parsing J2k Quality Layers from original J2k code stream without decompressing the original image
 - NL 4.0 will provide products in four Bit Rate Reduced versions e.g., 1.3 b/p, 2.3 b/p, etc.
 - At Highest Resolution (R0) or Reduced Resolution (R1-R9)
 - RSETs R5-R1 are produced by Parsing J2k Resolution Packets from original J2k code stream without decompressing the original image
 - NL 4.0 will provide RSETs R5 – R1; user selectable
 - Highest resolution RSET will be bit rate limited to 4.3 b/p
 - NL 4.0/IPL 4.0 Exports R6 – R9 Uncompressed in NITF 2.1 File Format produced from R5 parsed from original J2k codestream and decompressed

NL 4.0 JPEG 2000

- NL 4.0/IPL 4.0 Will Decompress J2k (VL or NL) and Export
 - Will Export decompressed imagery in NITF 2.1, Sun Raster, or TIFF 6.0 file formats
- NL 4.0/IPL4.0 Will Not Compress products made from decompressed FIA images or uncompressed FIA images

Currently participating in GeoScout led Study to determine optimal method for exporting JPEG2000 FIA images to IEC without degradation of IEC performance requirements

- Option 1 - NL 4.0/IPL 4.0 Will Not Transcode
 - J2k NL to/from J2k VL
 - J2k, NL or VL, (wavelet transform) to/from JPEG 8/12 (discrete cosine transform, DCT)
 - J2k to/from either TFRD 4.3 (pulse code modulation, PCM) or TFRD 2.3, 1.3 (DCT)
- Option 2 - NL 4.0/IPL 4.0 Will Transcode (proposed)
 - J2k Single Tile Part, Tile-Layer-Resolution-Component-Precinct (LRCP) to/from J2k Multiple Tile Parts, Resolution-Tile -Layer-Component-Precinct (RLCP)
 - Export to IEC and Import from IEC
 - » Allows IEC to Stream through RSETs more quickly than LRCP format
 - All J2K operations will be supported on both LRCP and RLCP formats